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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/602,980	06/24/2003	Shunpei Yamazaki	0553-0369	2058
7590 10/08/2008 COOK, ALEX, McFARRON, MANZO, CUMMINGS & MEHLER, LTD. SUITE 2850 200 WEST ADAMS STREET CHICAGO, IL 60606				
EXAMINER PERRY, ANTHONY T				
ART UNIT 2879		PAPER NUMBER		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/602,980

**Applicant(s)**

YAMAZAKI ET AL.

**Examiner**

ANTHONY T. PERRY

**Art Unit**

2879

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 28 July 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-15, 23-41 and 43-70 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 37-41, 43-52 and 69 is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-15, 23-27, 29-36, 53-57, 59-68 and 70 is/are rejected.
- 7) ☒ Claim(s) 7, 28 and 58 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-849)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 7/28/08, 8/21/08
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(c), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(c) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 7/28/08 has been entered.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 8, 10-15, 53-57, 59, 61-67, and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamada (US 6,114,715) in view of Friend et al. (US 6,518,700) further in view of Nagayama et al. (US 5,742,129).

Regarding claims 1, 10, 53, 61, 67, and 70, Hamada teaches a light-emitting device comprising: an anode as the first electrode comprising two layers (53 & 103), wherein the anode is connected to a thin film transistor (43) through an insulating film that is formed over the TFT (43), over a substrate (102) that has an insulating surface, and under and in contact with the first electrode (53 + 103); a partition wall (2) covering an edge of the first electrode (53 + 103) and formed over the insulating film (49); a layer comprising an organic compound (104-107) formed over and in contact with the first electrode (53 + 103); and a cathode as the second electrode 120

(108) in contact with the layer comprising an organic compound (for example, see Fig. 8). Hamada teaches the partition wall (2) comprising an organic resin layer (for example, see col. 5, lines 50-56) that contains carbon particles so that the bank itself has a light-absorbing property, wherein the partition wall made of organic resin layer has a top surface and a side surface, wherein the side surface is in contact with layer comprising an organic compound. Hamada teaches that the partition wall (2) in Fig. 8 may be replaced by the multilayer film (24) which inherently absorbs light (see col. 9, lines 48-51).

Hamada does not specifically teach the partition wall comprising a laminate of a separate organic resin layer and the light absorbing multilayer covering the top surface of the organic resin (see Fig. 8). However, Friend discloses an organic EL device having a similar structure and teaches that the partition wall itself can be made of a light absorbing material (like the one taught by Hamada) or it could have a light absorbing layer deposited over the partition wall and patterned at the same time as the partition wall (for example, see col. 6, lines 53-58). It would have been obvious to one having ordinary skills in the art at the time the invention was made to form the partition wall of a separate organic resin layer with a light absorbing layer covering the entire top surface thereof, since Friend teaches that such a construction as an alternative to an integral structure. Furthermore, it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art.

Hamada in view of Friend do not specifically teach the partition wall having a tapered side surface. However, providing partition walls having a trapezoidal shape is well known in the art, as evidenced by Nagayama. Nagayama et al. teach using a partition wall having a trapezoidal shape (side surface being tapered) is preferred in order to prevent the upper electrode provided over the wall from breaking during the deposition of said electrode (for example, see col. 6, lines 13-17). Accordingly it would have been obvious to one of ordinary skill in the art at

the time the invention was made to provide organic layer with a tapered side surface so as to ensure that the cathode provided over and on the partition walls does not contain in breaks therein.

Regarding claims 2 and 54, the partition wall covers other regions than a light emitting region in which the first electrode and the organic compound-containing layer are in contact with each other and laid on top of each other (see Fig. 8).

Regarding claims 3, 5, 55, and 57, Hamada teaches the multilayer film including a layer that comprises silicon oxide (see col. 7, lines 9-11).

Regarding claims 4 and 56, Hamada teaches the multilayer film including a layer that comprises silicon nitride (layer 12) (see col. 6, lines 43-47).

Regarding claims 8 and 11, Hamada and Friend only show a bottom-emitting type EL device, and as such does not specifically teach the first electrode being a light transmissive cathode. However, it is well known in the art that organic EL displays can be of the top-emitting type or bottom-emitting type, simply by reversing the order of the cathode, organic EL layer, and anode. In a top-emitting type EL device the cathode is formed of a conductive light transmissive material. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the first electrode be a light transmissive cathode where a top-emitting device is desired.

Regarding claims 12 and 63, Hamada teaches the organic compound being a material emitting blue light (see col. lines 23-32).

Regarding claims 13-14, Hamada and Friend do not specifically teach the organic EL layer being a white light-emitting material used with a color filter or being a material emitting monochromatic light used with a color conversion layer. However, it is well known in the art that there are three different methods of making an organic EL display a full-color display

including: (1) the three color light-emitting method, as taught by Hamada, where three different types of organic EL material are used that emit lights corresponding to the three primary colors; (2) a white color method in which white light emitted by an organic EL element for emitting white light is passed through a color filter so as to be divided into the three primary colors; and (3) a color conversion method in which a monochromatic light emitting EL element emitting blue light is passed through a fluorescent dye layer and converted into red and green. The color conversion layers and color filters are located in a sealing member to protect them from outside elements. Each of the methods have different known advantages. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use any of the types to form a full-color organic EL display.

Regarding claim 15, Hamada teaches that the organic EL display device provides high-definition images. Hamada and Friend does not specifically recite the EL device used in one of the claimed devices. However, the use of color organic EL devices in such display devices as claimed is well known in the art. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the organic EL display device taught by Hamada in one of the claimed devices because of its ability to provide high-definition images.

Regarding claims 59 and 62, Hamada and Friend only show a bottom-emitting type EL device, and as such does not specifically teach the first electrode being a light transmissive cathode. However, it is well known in the art that organic EL displays can be of the top-emitting type or bottom-emitting type, simply by reversing the order of the cathode, organic EL layer, and anode. In a top-emitting type EL device the cathode is formed of a conductive light transmissive material. Accordingly, it would have been obvious to one of ordinary skill in the art at the time

the invention was made to have the first electrode be a light transmissive cathode where a top-emitting device is desired.

Regarding claims 64-65, Hamada and Friend do not specifically teach the organic EL layer being a white light-emitting material used with a color filter or being a material emitting monochromatic light used with a color conversion layer. However, it is well known in the art that there are three different methods of making an organic EL display a full-color display including: (1) the three color light-emitting method, as taught by Hamada, where three different types of organic EL material are used that emit lights corresponding to the three primary colors; (2) a white color method in which white light emitted by an organic EL element for emitting white light is passed through a color filter so as to be divided into the three primary colors; and (3) a color conversion method in which a monochromatic light emitting EL element emitting blue light is passed through a fluorescent dye layer and converted into red and green. The color conversion layers and color filters are located in a sealing member to protect them from outside elements. Each of the methods have different known advantages. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use any of the types to form a full-color organic EL display.

Regarding claim 66, Hamada teaches that the organic EL display device provides high-definition images. Hamada and Friend do not specifically state that the EL device is used in one of the claimed devices. However, the use of color organic EL devices in such display devices as claimed is well known in the art. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the organic EL display device taught by Hamada in one of the claimed devices because of its ability to provide high-definition images.

Claims 9 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamada (US 6,114,715) in view of Friend et al. (US 6,518,700) in view of Nagayama et al. (US 5,742,129) as applied to claims 1 and 53, above, in view of Oda et al. (US 6,396,208).

Regarding claim 9, Hamada and Friend do not specifically teach the first electrode having a concave shape. However, Oda teaches the first electrode having a concave shape so as to utilize the reflection of concave electrode for improving light-collection efficiency (for example, see the abstract). Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the first electrode with a concave shape in order to increase light-collection efficiency providing a brighter display.

Regarding claim 60, Hamada and Friend do not specifically teach the first electrode having a concave shape. However, Oda teaches the first electrode having a concave shape so as to utilize the reflection of concave electrode for improving light-collection efficiency (for example, see the abstract). Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the first electrode with a concave shape in order to increase light-collection efficiency providing a brighter display.

Claims 1-2, 4-5, 8, 10-15, 53-54, 56-57, 59, and 61-66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamada (US 6,114,715) in view of Friend et al. (US 6,518,700), and further in view of Iwase et al. (US 6,768,534) in view of Nagayama et al. (US 5,742,129).

Regarding claims 1, 4-5, 10, 53, 56, 57, and 61, Hamada teaches a light-emitting device comprising: an anode comprising two layers (53 & 103), wherein the anode is connected to a thin film transistor (43) through an insulating film that is formed over the TFT (43), over a substrate (102) that has an insulating surface, and under and in contact with the first electrode (53 + 103); a partition wall (2) covering an edge of the first electrode (53 + 103) and formed over



the insulating film (49); a layer comprising an organic compound (104-107) formed over and in contact with the first electrode (53 + 103); and a cathode as the second electrode (108) in contact with the layer comprising an organic compound (for example, see Fig. 8). Hamada teaches the partition wall (2) comprising an organic resin layer (for example, see col. 5, lines 50-56) that contains carbon particles so that the bank itself has a light-absorbing property, wherein the partition wall made of organic resin layer has a top surface and a side surface, wherein the side surface is in contact with layer comprising an organic compound.

Hamada does not specifically teach the partition wall comprising a laminate of a separate organic resin layer and the light absorbing layer covering the top surface of the organic resin (see Fig. 8). However, Friend discloses an organic EL device having a similar structure and teaches that the partition wall itself can be made of a light absorbing material (like the one taught by Hamada) or it could have a light absorbing layer deposited over the partition wall and patterned at the same time as the partition wall (for example, see col. 6, lines 53-58). It would have been obvious to one having ordinary skills in the art at the time the invention was made to form the partition wall of a separate organic resin layer with a light absorbing layer covering the entire top surface thereof, since Friend teaches that such a construction as an alternative to an integral structure. Furthermore, it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art.

Hamada in view of Friend does not specifically teach the light-absorbing layer (black matrix layer) comprising multiple layers. However, Iwase et al. teaches two different types of black matrix films. One comprised of a single layer and one comprising multiple layers. Iwase teaches that the multilayer film has a predetermined reflected light attenuating structure and comprises a chromium metallic layer and a light transmissive insulating layer comprising nitride. Accordingly, it would have been obvious to one of ordinary skill at the time the invention was

made to reasonably contemplate the use of such a black matrix multilayer film since Iwase teaches that it has a predetermined reflected light attenuating structure and that it is a known alternative to a single layer black matrix film.

Hamada in view of Friend and Iwase do not specifically teach the partition wall having a tapered side surface. However, providing partition walls having a trapezoidal shape is well known in the art, as evidenced by Nagayama. Nagayama et al. teach using a partition wall having a trapezoidal shape (side surface being tapered) is preferred in order to prevent the upper electrode provided over the wall from breaking during the deposition of said electrode (for example, see col. 6, lines 13-17). Accordingly it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide organic layer with a tapered side surface so as to ensure that the cathode provided over and on the partition walls does not contain in breaks therein.

Regarding claim 2 and 54, the partition wall (2) covers other regions than a light emitting region in which the first electrode (53 + 103) and the organic compound-containing layer (104-107) are in contact with each other and laid on top of each other (see Fig. 8).

Regarding claim 12 and 63, Hamada teaches the organic compound being a material emitting blue light (see col. lines 23-32).

Regarding claims 8, 11, 59, and 62, Hamada only shows a bottom-emitting type EL device, and as such does not specifically teach the first electrode being a light transmissive cathode. However, it is well known in the art that organic EL displays can be of the top-emitting type or bottom-emitting type, simply by reversing the order of the cathode, organic EL layer, and anode. In a top-emitting type EL device the cathode is formed of a conductive light transmissive material. Accordingly, it would have been obvious to one of ordinary skill in the art at the time

the invention was made to have the first electrode be a light transmissive cathode where a top-emitting device is desired.

Regarding claims 13-14 and 64-65, Hamada does not specifically teach the organic EL layer being a white light-emitting material used with a color filter or being a material emitting monochromatic light used with a color conversion layer. However, it is well known in the art that there are three different methods of making an organic EL display a full-color display including: (1) the three color light-emitting method, as taught by Hamada, where three different types of organic EL material are used that emit lights corresponding to the three primary colors; (2) a white color method in which white light emitted by an organic EL element for emitting white light is passed through a color filter so as to be divided into the three primary colors; and (3) a color conversion method in which a monochromatic light emitting EL element emitting blue light is passed through a fluorescent dye layer and converted into red and green. The color conversion layers and color filters are located in a sealing member to protect them from outside elements. Each of the methods have different known advantages. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use any of the types to form a full-color organic EL display.

Regarding claims 15 and 66, Hamada teaches that the organic EL display device provides high-definition images. Hamada does not specifically state that the EL device is used in one of the claimed devices. However, the use of color organic EL devices in such display devices as claimed is well known in the art. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the organic EL display device taught by Hamada in one of the claimed devices because of its ability to provide high-definition images.

Claims 9 and 60 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamada (US 6,114,715) in view of Friend et al. (US 6,518,700) in view of Iwase et al. (US 6,768,534) in view of Nagayama et al. (5,742,129) as applied to claims 1 and 53, above, in view of Oda et al. (US 6,396,208).

Regarding claims 9 and 60, Hamada does not specifically teach the first electrode having a concave shape. However, Oda teaches the first electrode having a concave shape so as to utilize the reflection of concave electrode for improving light-collection efficiency (for example, see the abstract). Accordingly, it would have been obvious to one of ordinary skill at the time the invention was made to provide the first electrode with a concave shape so as to utilize the reflection of concave electrode for improving light-collection efficiency.

Claims 1-5, 8, and 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamada (US 6,114,715) in view of Friend et al. (US 6,518,700) in view of Kaneda et al. (JP 2000-269473) and further in view of Nagayama et al. (US 5,742,129).

Regarding claims 1, 3-5, and 10, Hamada teaches a light-emitting device comprising: an anode comprising two layers (53 & 103), wherein the anode is connected to a thin film transistor (43) through an insulating film that is formed over the TFT (43), over a substrate (102) that has an insulating surface, and under and in contact with the first electrode (53 + 103); a partition wall (2) covering an edge of the first electrode (53 + 103) and formed over the insulating film (49); a layer comprising an organic compound (104-107) formed over and in contact with the first electrode (53 + 103); and a cathode as the second electrode (108) in contact with the layer comprising an organic compound (for example, see Fig. 8). Hamada teaches the partition wall (2) comprising an organic resin layer (for example, see col. 5, lines 50-56) that contains carbon particles so that the bank itself has a light-absorbing property, wherein the partition wall made of

organic resin layer has a top surface and a side surface, wherein the side surface is in contact with layer comprising an organic compound.

Hamada does not specifically teach the partition wall comprising a laminate of a separate organic resin layer and the light absorbing layer covering the top surface of the organic resin (see Fig. 8). However, Friend discloses an organic EL device having a similar structure and teaches that the partition wall itself can be made of a light absorbing material (like the one taught by Hamada) or it could have a light absorbing layer deposited over the partition wall and patterned at the same time as the partition wall (for example, see col. 6, lines 53-58). It would have been obvious to one having ordinary skills in the art at the time the invention was made to form the partition wall of a separate organic resin layer with a light absorbing layer covering the entire top surface thereof, since Friend teaches that such a construction as an alternative to an integral structure. Furthermore, it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art.

Hamada in view of Friend does not specifically teach the light-absorbing layer (black matrix layer) comprising multiple layers. However, Kaneda et al. teaches a multilayer light-absorbing film comprising a SiO<sub>2</sub> layer (56), a titanium nitride layer (53), an aluminum metal layer (55), and another SiO<sub>2</sub> layer (56) (see Fig. 1 and paragraphs 0012-0013) that provides an improved light-absorbing layer that absorbs 90% or more of reflected ambient light, protecting the transistors from degradation and eventual malfunction. Accordingly, it would have been obvious to one of ordinary skill at the time the invention was made to use such a superior light-absorbing multilayer film in place of the single layer film disclosed in the Hamada reference in order to increase the amount of ambient light absorbed providing improved TFT protection.

Hamada in view of Friend and Kaneda do not specifically teach the partition wall having a tapered side surface. However, providing partition walls having a trapezoidal shape is well

known in the art, as evidenced by Nagayama. Nagayama et al. teach using a partition wall having a trapezoidal shape (side surface being tapered) is preferred in order to prevent the upper electrode provided over the wall from breaking during the deposition of said electrode (for example, see col. 6, lines 13-17). Accordingly it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide organic layer with a tapered side surface so as to ensure that the cathode provided over and on the partition walls does not contain in breaks therein.

Regarding claim 2, the partition wall (2) covers other regions than a light emitting region in which the first electrode (53 + 103) and the organic compound-containing layer (104-107) are in contact with each other and laid on top of each other (see Fig. 8).

Regarding claims 6-7, Kaneda teaches the SiO<sub>2</sub> layers (56 and 54) being replaced with silicon nitride in order to increase the light absorption even further (to about 99%) (see for example paragraph 0016).

Regarding claim 12, Hamada teaches the organic compound being a material emitting blue light (see col. lines 23-32).

Regarding claims 8 and 11, Hamada only shows a bottom-emitting type EL device, and as such does not specifically teach the first electrode being a light transmissive cathode. However, it is well known in the art that organic EL displays can be of the top-emitting type or bottom-emitting type, simply by reversing the order of the cathode, organic EL layer, and anode. In a top-emitting type EL device the cathode is formed of a conductive light transmissive material. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the first electrode be a light transmissive cathode where a top-emitting device is desired.

Regarding claims 13-14, Hamada, Friend, and Kaneda do not specifically teach the organic EL layer being a white light-emitting material used with a color filter or being a material emitting monochromatic light used with a color conversion layer. However, it is well known in the art that there are three different methods of making an organic EL display a full-color display including: (1) the three color light-emitting method, as taught by Hamada, where three different types of organic EL material are used that emit lights corresponding to the three primary colors; (2) a white color method in which white light emitted by an organic EL element for emitting white light is passed through a color filter so as to be divided into the three primary colors; and (3) a color conversion method in which a monochromatic light emitting EL element emitting blue light is passed through a fluorescent dye layer and converted into red and green. The color conversion layers and color filters are located in a sealing member to protect them from outside elements. Each of the methods have different known advantages. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use any of the types to form a full-color organic EL display.

Regarding claim 15, Hamada teaches that the organic EL display device provides high-definition images. Hamada does not specifically state that the EL device is used in one of the claimed devices. However, the use of color organic EL devices in such display devices as claimed is well known in the art. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the organic EL display device taught by Hamada in one of the claimed devices because of its ability to provide high-definition images.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamada (US 6,114,715) in view of Friend et al. (US 6,518,700) in view of Kaneda et al. (JP 2000-269473) in

view of Nagayama et al. (US 5,742,129) as applied to claim 1, above, in view of Oda et al. (US 6,396,208).

Regarding claim 9, Hamada and Kaneda do not specifically teach the first electrode having a concave shape. However, Oda teaches the first electrode having a concave shape so as to utilize the reflection of concave electrode for improving light-collection efficiency (for example, see the abstract). Accordingly, it would have been obvious to one of ordinary skill at the time the invention was made to provide the first electrode with a concave shape so as to utilize the reflection of concave electrode for improving light-collection efficiency.

Claims 23-27, 29, 31-36, and 68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamada (US 6,114,715) in view of Friend et al. (US 6,518,700) in view of Kaneda et al. (JP 2000-269473) in view of Nagayama et al. (US 5,742,129).

Regarding claims 23, 25-27, 31, and 68, Hamada teaches a light-emitting device comprising: an anode comprising two layers (53 & 103), wherein the anode is connected to a thin film transistor (43) through an insulating film that is formed over the TFT (43), over a substrate (102) that has an insulating surface, and under and in contact with the first electrode (53 + 103); a partition wall (2) covering an edge of the first electrode (53 + 103) and formed over the insulating film (49); a layer comprising an organic compound (104-107) formed over and in contact with the first electrode (53 + 103); and a cathode as the second electrode (108) in contact with the layer comprising an organic compound (for example, see Fig. 8). Hamada teaches the partition wall (2) comprising an organic resin layer (for example, see col. 5, lines 50-56) that contains carbon particles so that the bank itself has a light-absorbing property, wherein the partition wall made of organic resin layer has a top surface and a side surface, wherein the side surface is in contact with layer comprising an organic compound.



Hamada does not specifically teach the partition wall comprising a laminate of a separate organic resin layer and the light absorbing layer covering the top surface of the organic resin (see Fig. 8). However, Friend discloses an organic EL device having a similar structure and teaches that the partition wall itself can be made of a light absorbing material (like the one taught by Hamada) or it could have a light absorbing layer deposited over the partition wall and patterned at the same time as the partition wall (for example, see col. 6, lines 53-58). It would have been obvious to one having ordinary skills in the art at the time the invention was made to form the partition wall of a separate organic resin layer with a light absorbing layer covering the entire top surface thereof, since Friend teaches that such a construction as an alternative to an integral structure. Furthermore, it has been held that constructing a formerly integral structure in various elements involves only routine skill in the art.

Hamada in view of Friend does not specifically teach the light-absorbing layer (black matrix layer) comprising multiple layers. However, Kaneda et al. teaches a multilayer light-absorbing film comprising a SiO<sub>2</sub> layer (56), a titanium nitride layer (53), an aluminum metal layer (55), and another SiO<sub>2</sub> layer (56) (see Fig. 1 and paragraphs 0012-0013) that provides an improved light-absorbing layer that absorbs 90% or more of reflected ambient light, protecting the transistors from degradation and eventual malfunction. Kaneda teaches a layer of silicon nitride between the interface of the titanium nitride film and the SiO<sub>2</sub> layer in order to increase the light absorption even further (to about 99%) (see for example paragraph 0016). Accordingly, it would have been obvious to one of ordinary skill at the time the invention was made to use such a superior light-absorbing multilayer film, which includes at least three layers of different materials, in place of the single layer film disclosed in the Hamada reference in order to increase the amount of ambient light absorbed providing improved TFT protection.

Hamada in view of Friend and Kaneda do not specifically teach the partition wall having a tapered side surface. However, providing partition walls having a trapezoidal shape is well known in the art, as evidenced by Nagayama. Nagayama et al. teach using a partition wall having a trapezoidal shape (side surface being tapered) is preferred in order to prevent the upper electrode provided over the wall from breaking during the deposition of said electrode (for example, see col. 6, lines 13-17). Accordingly it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide organic layer with a tapered side surface so as to ensure that the cathode provided over and on the partition walls does not contain in breaks therein.

Regarding claim 24, the partition wall (2) covers other regions than a light emitting region in which the first electrode (53 + 103) and the organic compound-containing layer (104-107) are in contact with each other and laid on top of each other (see Fig. 8).

Regarding claim 33, Hamada teaches the organic compound being a material emitting blue light (see col. lines 23-32).

Regarding claims 29 and 32, Hamada only shows a bottom-emitting type EL device, and as such does not specifically teach the first electrode being a light transmissive cathode. However, it is well known in the art that organic EL displays can be of the top-emitting type or bottom-emitting type, simply by reversing the order of the cathode, organic EL layer, and anode. In a top-emitting type EL device the cathode is formed of a conductive light transmissive material. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the first electrode be a light transmissive cathode where a top-emitting device is desired.

Regarding claims 34-35, Hamada and Kaneda do not specifically teach the organic EL layer being a white light-emitting material used with a color filter or being a material emitting

monochromatic light used with a color conversion layer. However, it is well known in the art that there are three different methods of making an organic EL display a full-color display including: (1) the three color light-emitting method, as taught by Hamada, where three different types of organic EL material are used that emit lights corresponding to the three primary colors; (2) a white color method in which white light emitted by an organic EL element for emitting white light is passed through a color filter so as to be divided into the three primary colors; and (3) a color conversion method in which a monochromatic light emitting EL element emitting blue light is passed through a fluorescent dye layer and converted into red and green. The color conversion layers and color filters are located in a sealing member to protect them from outside elements. Each of the methods have different known advantages. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use any of the types to form a full-color organic EL display.

Regarding claim 36, Hamada teaches that the organic EL display device provides high-definition images. Hamada does not specifically state that the EL device is used in one of the claimed devices. However, the use of color organic EL devices in such display devices as claimed is well known in the art. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the organic EL display device taught by Hamada in one of the claimed devices because of its ability to provide high-definition images.

Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamada (US 6,114,715) in view of Friend et al. (US 6,518,700) in view of Kaneda et al. (JP 2000-269473) in view of Nagayama et al. (US 5,742,129) as applied to claim 23, above, in view of Oda et al. (US 6,396,208).

Regarding claim 30, Hamada, Friend, Kaneda, and Nagayama do not specifically teach the first electrode having a concave shape. However, Oda teaches the first electrode having a concave shape so as to utilize the reflection of concave electrode for improving light-collection efficiency (for example, see the abstract). Accordingly, it would have been obvious to one of ordinary skill at the time the invention was made to provide the first electrode with a concave shape so as to utilize the reflection of concave electrode for improving light-collection efficiency.

***Allowable Subject Matter***

Claims 7 and 58 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 37-52 and 69 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Prior art fails to disclose or fairly suggest:

- A partition wall that includes a light absorbing multilayer film comprising a laminate of a metal film mainly composed of aluminum, a silicon nitride film, a titanium nitride film, and another silicon nitride film, in combination with the remaining claimed limitations as called for in claims 7 and 58;
- A partition wall that includes a light absorbing multilayer film comprising a laminate including a reflective metal film, a first light transmissive insulating film comprising nitride, a metal nitride film, and a second light transmissive insulating film comprising nitride, in combination with the remaining claimed limitations as

called for in claim 37 (claims 38-41, 43-52, and 69 are allowable for the same reasons since they are dependent on claim 37).

***Response to Arguments***

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

**Contact Information**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to *Anthony Perry* whose telephone number is (571) 272-2459. The examiner can normally be reached between the hours of 9:00AM to 5:30PM Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel, can be reached on (571) 272-2457. **The fax phone number for this Group is (571) 273-8300.**

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